

What Do We Know About Cancer?

A Bicentennial Perspective

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Some Historical Mileposts

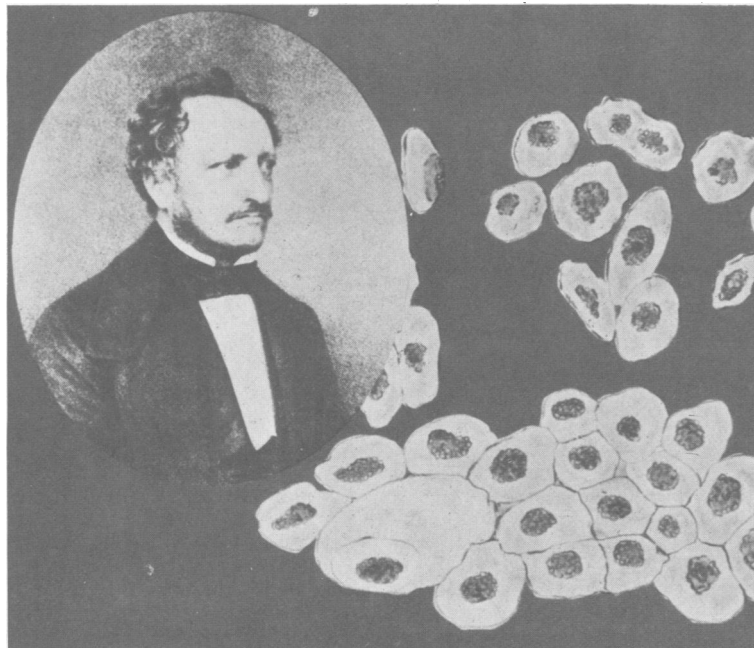
WHAT HAS BEEN LEARNED about neoplastic diseases during the past 200 years? Twelve events and subsequent developments can be indicated as historical mileposts. These are illustrated by historical covers from *Cancer Research* or other photographs from that journal's files.

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200 years since the first description of an occupational, environmental cancer (Percival Pott, England, 1775). Shown are Percival Pott and 18th century chimneysweeps.

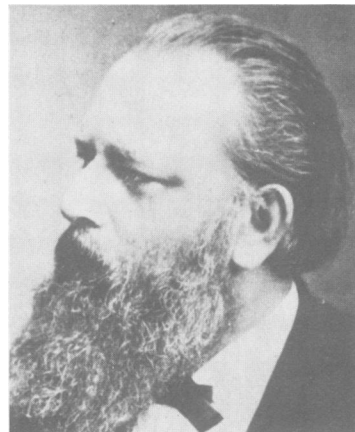


140 years since the first histological studies on cancer (Johannes Müller, Germany, 1838). Johannes Müller is pictured with illustrations of cancer cells.

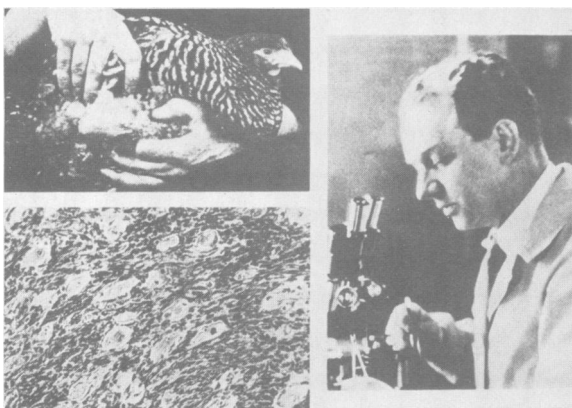
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100 years since the first successful transplantation of cancer in animals (M. Novinsky, Russia, 1876). M. Novinsky and transplanted dog cancers are pictured.



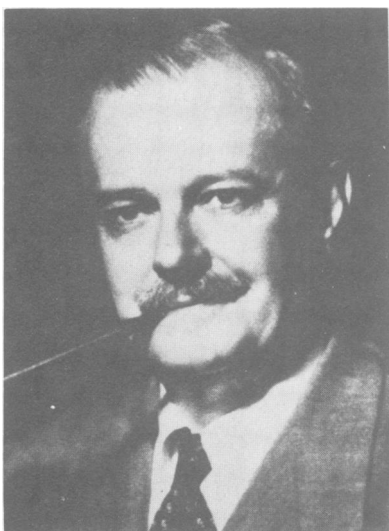
100 years since the introduction of modern surgical procedures for cancer (Theodor Billroth and others, Austria, 1880's).



65 years since the discovery of the first virus-induced cancers (Peyton Rous, U.S.A., 1911). The photograph illustrates Rous' work with virus tumors of chickens.



60 years since the first chemically-induced (tar) cancers in animals (K. Yamagiwa, Japan, 1915). Shown are Japanese researchers K. Yamagiwa (right) and K. Ichikawa (left).

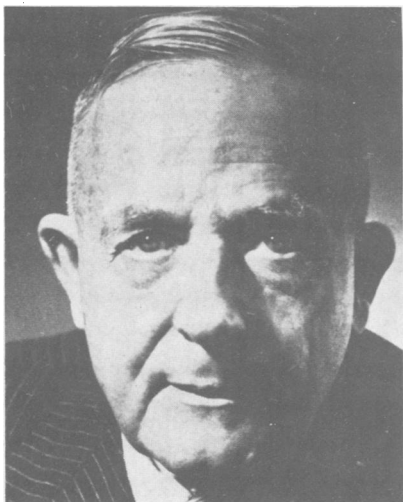


55 years since the initiation of genetic studies of cancer (C. C. Little and others, U.S.A., 1920's).

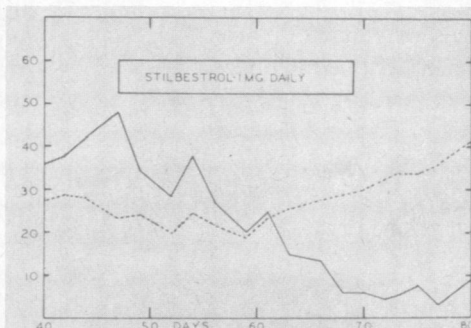


55 years since modern radiotherapy for cancer (H. Coutard and C. Regaud, France, 1922). Regaud is shown on left and Coutard on right.

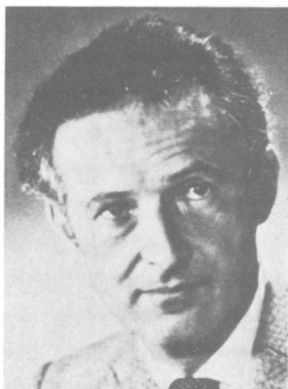
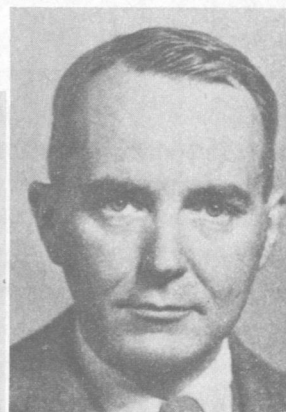
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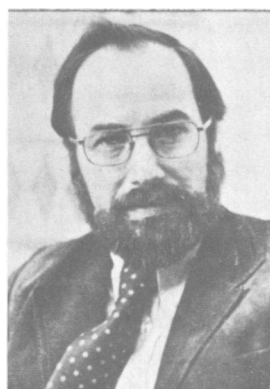
50 years since modern biochemistry in cancer (Otto Warburg, Germany, 1926).



35 years since the beginning of modern chemotherapy for cancer (Charles Huggins and others, U.S.A., 1940's). A graph from Huggins' work with chemotherapy of prostatic cancer is shown.



15 years since the modern period of immunology of cancer (George Klein and others, Sweden, 1960). Shown are George and Eva Klein.



10 years since the application of molecular biology to cancer (Howard M. Temin and others, U.S.A., 1960's). D. Baltimore (left) and H. M. Temin (right) are shown.

Scientific progress is achieved by individual investigators, often by several simultaneously, when the accumulated information reaches a critical mass. But of importance equal to the genius and devotion of individual scientists is the program against cancer conceived and developed in the United States. This program was written into law in 1937 and in 1971, as the National Cancer Acts, proclaiming that the cancer problem can and will be solved by scientific research, and committing national treasure toward the goal. And the major stimulant of the program was the American Society for the Control of Cancer created in 1913 and organized as the American Cancer Society in 1944.

What Is Cancer?

Our present knowledge regarding neoplastic diseases can be summarized in five broad statements.

- Cancer is a large group of diseases, characterized by changes in somatic cells that are transmissible to daughter cells.
- The basic cellular change that eventuates in the clinical manifestations of cancer involves the genetic component, the deoxyribonucleic acid moiety, of the nucleus.
- The cancerous change can be triggered by a wide variety of environmental stimuli, including physical, chemical, and viral agents.
- The cancerous process is usually manifested after prolonged repeated exposures to the carcinogenic stimulus, and evolves through a series of changes.
- The cancerous process is influenced by many host factors, including heredity, nutrition and immunologic status.

What Can Be Done Against Cancer?

Knowledge regarding cancer has led to the following practical applications:

- In *prevention*, hundreds of defined environmental carcinogens have been identified. Tobacco smoking, industrial chemicals and ionizing radiation are man-made hazards; aflatoxin is an example of a natural carcinogen. Avoidance or elimination of exposures to carcinogens would prevent a significant proportion of cancers in man.

- In *diagnosis*, pathology remains supreme, with the biopsy being the basis, and microscopic designation of histogenesis, staging and grading leading to the determination of prognosis as well as of diagnosis.

- In *treatment*, surgical operation remains the

most definitive approach, aiming at total removal of the cancer. Radiotherapy is curative in cancers responsive to host-tolerated doses and encompassable by the beam. Chemotherapy cures some rapidly-proliferating cancers. Combinations of all three modalities are of increasing importance.

- In *prognosis*, the salvage rate of all patients with cancer approaches 40 percent at five years after treatment. Improvements in salvage for patients with some cancers are insufficient to reverse rising mortality from other cancers.

- Real victory over cancer is still in the future, requiring better application of available knowledge and discoveries of new preventive and therapeutic methods through research.

"Things won are done: joy's soul lies in the doing."—SHAKESPEARE, *Troilus and Cressida*, Act I, scene ii, line 313.

Using Tetracycline in the Treatment of Pustular Acne

The major sales in this country for tetracyclines appear to be for the treatment of pustular acne, at a dosage of 250 mg once a day. For many years . . . we really couldn't see the rationale for employment of such a small amount of antibiotic and we used to say "it's hogwash!" Subsequently, some dermatologists, at least the investigative ones, came up with two rationales. One is that one of the organisms responsible for pustular acne is *Coryne bacterium acneformi*. This particular type of organism has various lepolytic enzymes that break down sebaceous material. It appears that tetracycline is effective not only against the organism but also in decreasing sterol production, so it appears to work. It is also associated with very little evidence for harm, even when given in chronic dosages.

—MARVIN TURCK, MD, *Seattle*
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